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Numerical modeling of electron oscillation damping in an ultra-cold plasma[1] JACOB ROBERTS, WEI-TING CHEN, CRAIG WITTE, Colorado State University — By using electric fields to apply an impulse to electrons in an ultracold plasma, it is possible to induce electron oscillations. These oscillations damp due to factors such as electron-ion collisions and the density inhomogeneity of the ultracold plasma. We present results from a numerical model of these electron oscillations that links their frequency and damping rate to ultracold plasma parameters such as density, electron temperature, charge imbalance, and applied electric field. We discuss the relationship between the electron-ion collision rate and the predicted electron oscillation damping time, as these two quantities have a non-trivial relationship. Finally, we discuss non-collisional damping mechanisms that dominate the damping rate at higher electron temperatures.

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